TOSHIBA
Leading Innovation >>>

AIR CONDITIONER (SPLIT TYPE)

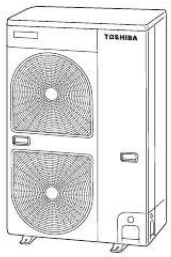
Installation manual

HFC R410A

Outdoor Unit

Model name:

RAV-SM2244AT7	RAV-SM2804AT7
RAV-SM2244AT7Z	RAV-SM2804AT7Z
RAV-SM2244AT7ZG	RAV-SM2804AT7ZG
RAV-SM2244AT8-E	RAV-SM2804AT8-E
RAV-SM2244AT8Z-E	RAV-SM2804AT8Z-E
RAV-SM2244AT8ZG-E	RAV-SM2804AT8ZG-E



English EN

Manual abstract:

41 1.72 Contents 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ACCESSORY PARTS . . . . . .
. . . . .
. . . . .
. . . . . .

. . . . . .
. . . . .
. . . . .
. . . . . 2 SAFETY PRECAUTIONS . . .

. . . . . .
. . . . .
. . . . .
. . . . . .

. . . . . .
. . . . .
. . . . .
3 INSTALLATION OF NEW REFRIGERANT AIR CONDITIONER . . . . . .

. . . . . .
. . . 4 INSTALLATION CONDITIONS . .
. . . . .
. . . . . .

. . . . . .
. . . . .
. . . . .
. . . . . .

. . 6 REFRIGERANT PIPING. . . . . .
. . . . .
. . . . .
. . . . . .

. . . . . .
. . . . .
. . . . .
. . . . . 10 AIR PURGING . . . .

. . . . . .
. . . . .
. . . . .
. . . . . .

. . . . . .
. . . . .
. . . . .
. . . . . 14 ELECTRICAL WORK. . .

. . . . . .
. . . . .
. . . . .
. . . . . .

. . . . . .
. . . . .
. . . . .
. . . 17 EARTHING . . . . . .

. . . . . .
. . . . .
. . . . .
. . . . . .

. . . . 24 EN 1 Digital Inverter 1 ACCESSORY PARTS Accessory Parts Part name Installation manual Q'ty 1 Shape Usage (Hand this directly to the customer.) Drain nipple Waterproof rubber cap Protective bush 1 1 1 For protecting wires (pipe cover) Guard material for passage part 1 For protecting

passage part (pipe cover) Clamp filter 1 For conforming to EMC standards (Used for power wire) For the pipe inside the outdoor unit For connecting the pipe Ø19.1 mm pipe Joint (Ø19.1 Ø25.4 mm) 1 1 Joint (Ø25.4 Ø28.

6 mm) 1 For connecting the pipe Elbow 1 For connecting the pipe INFORMATION · · · · · · The main pipe on the gas side of this outdoor unit has a diameter of Ø28.6 mm, but a Ø19.1 mm flare connection is used where the valve is connected. Be sure to use the Ø19.1 mm pipe and joint provided as accessories for the pipe connection.

Before installing the unit, check that the unit has the correct model name to prevent the wrong unit from being installed in the wrong place.

@@@@@@@@RAV-SM2244 RAV-SM2804 · · Branch pipe kit RBC-DTWP101E RBC-DTWP101E Combination indoor unit SM56 × 4 units SM80 × 4 units P.C. board settings are required for some of the indoor units if they are to be used in a twin, triple or double twin system. Refer to the instructions in the installation manual of the branch pipe kit, and ensure that the settings are selected correctly.

Combination with the indoor units Combination with the indoor units is possible only when units with the same type are combined. Combinations of units with different types cannot be used. 2 EN Digital Inverter 2 SAFETY PRECAUTIONS · · · · · Ensure that all Local, National and International regulations are satisfied. Read these "SAFETY PRECAUTIONS" carefully before installation. The precautions described below include important items regarding safety. Observe them without fail. After the installation work, perform a trial operation to check for any problem. Follow the Owner's Manual to explain to the customer how to use and maintain the unit. Ask the customer to keep the Installation Manual together with the Owner's Manual. WARNING · Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.

Perform installation work properly according to the Installation Manual. Inappropriate installation may result in water leakage, electric shock or fire. Be sure to connect earth wire (grounding work). Incomplete grounding cause an electric shock. Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone wires. Turn off the main power supply switch or breaker before attempting any electrical work and maintenance. Make sure all power switches are off. Failure to do so may cause electric shock. Use an exclusive power circuit for the air conditioner. Use the rated voltage. Connect the connecting wire correctly. If the connecting wire is incorrect, electric parts may be damaged. When moving the air conditioner for installation to another place, be very careful not to allow the specified refrigerant (R410A) to become mixed with any other gaseous body into the refrigeration cycle. If air or any other gas mixes with the refrigerant, the gas pressure in the refrigeration cycle will become abnormally high and it may result in the pipe bursting or personal injuries. Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.

Do not touch the intake or aluminum fins of the outdoor unit. Doing so may result in injury. Tighten the flare nut with a torque wrench in the specified manner. Excessive tightening of the flare nut may cause a crack in the flare nut after a long period, which may result in refrigerant leakage. Install the air conditioner securely in a location where the base can sustain the weight of the unit adequately.

Perform the specified installation work to guard against an earthquake. If the air conditioner is not installed appropriately, accidents may occur due to the unit falling. If refrigerant gas has leaked during the installation work, ventilate the room immediately. If the leaked refrigerant gas comes in contact with fire, noxious gas may be generated. After the installation work, confirm that refrigerant gas does not leak. If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas may be generated. Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply. An insufficient power supply capacity or inappropriate installation may cause fire. Use only the specified wiring during the unit installation.

Ensure that all terminals are securely fixed, so preventing any external forces having a negative effect on the terminals. When the air conditioner cannot cool or heat a room well, contact the dealer from whom you purchased the air conditioner as refrigerant leakage is considered as the cause. In the case of repair that requires refill of refrigerant, ask service personnel about details of the repair. The refrigerant used in the air conditioner is harmless. Generally, the refrigerant does not leak. However, if the refrigerant leaks in a room and a heater or stove burner in the room catches fire, it may generate toxic gas. When you ask service personnel for repairing refrigerant leakage, confirm that the leakage portion has been completely repaired. Conform to the regulations of the local electric company when wiring the power supply. Inappropriate grounding may cause electric shock.

Do not install the air conditioner in a location that may be subjected to a risk of exposure to a combustible gas.
If a combustible gas leaks and becomes concentrated around the unit, a fire may occur. · · · · · · · · · · · · · · · EN 3 Digital Inverter · · Install the refrigerant pipe securely during the installation work before operating the air conditioner. If the compressor is operated with the valve open and without the refrigerant pipe, the compressor sucks air and the refrigeration cycle is overpressurized, which may cause a burst or injury. When carrying out the pump-down work, shut down the compressor before disconnecting the refrigerant pipe. Disconnecting the refrigerant pipe with the service valve left open and with the compressor still operating will cause air, etc.
to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in rupturing, injury, etc. CAUTION · · Do not climb onto or place objects on top of the outdoor unit. You may fall or the objects may fall off of the outdoor unit and result in injury. Wear heavy gloves during the installation work to avoid injury. To Disconnect the Appliance from the Main Power Supply · This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.
· A 25 A installation fuse (all fuse types can be used) must be used for the power supply line of this conditioner. 3 INSTALLATION OF NEW REFRIGERANT AIR CONDITIONER CAUTION New Refrigerant Air Conditioner Installation · THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER. R410A refrigerant is apt to be affected by impurities such as water, oxidizing membrane, and oils because the working pressure of R410A refrigerant is approx. 1.6 times as that of refrigerant R22. Accompanied with the adoption of the new refrigerant, the refrigerant oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerant oil does not enter the new type refrigerant R410A air conditioner cycle. To prevent mixing of refrigerant or refrigerant oil, the sizes of connecting sections of charging port on main unit and installation tools are different from those of the conventional refrigerant units. Accordingly, special tools are required for the new refrigerant (R410A) units. For connecting pipes, use new and clean piping materials with high pressure fittings made for R410A only, so that water and/or dust does not enter.

4 EN Digital Inverter Required Tools/Equipment and Precautions for Use Prepare the tools and equipment listed in the following table before starting the installation work. Newly prepared tools and equipment must be used exclusively. Legend : Prepared newly (Use for R410A only. Do not use for refrigerant R22 or R407C etc.) : Conventional tools/equipment are available Tools/equipment Gauge manifold Charging hose Charging cylinder Gas leak detector Vacuum pump Vacuum pump with backflow prevention function Flare tool Bender Refrigerant recovery equipment Torque wrench Pipe cutter Welding machplaints from customers. Air purge · · To purge air, use a vacuum pump. Do not use refrigerant charged in the outdoor unit to purge air. (The air purge refrigerant is not contained in the outdoor unit.) Electrical wiring · Be sure to fix the power wires and indoor/outdoor connecting wires with clamps so that they do not come into contact with the cabinet, etc. 6 EN Digital Inverter Installation Location WARNING Install the outdoor unit properly in a location that is durable enough to support the weight of the outdoor unit.
Insufficient durability may cause the outdoor unit to fall, which may result in injury. This outdoor unit has a weight of about 135 kg. Pay special attention when installing the unit onto a wall surface. CAUTION 1. Install the outdoor unit in a location where the discharge air is not blocked.
2. When an outdoor unit is installed in a location that is always exposed to strong winds like a coast or on the high stories of a building, secure normal fan operation by using a duct or wind shield. 3. When installing the outdoor unit in a location that is constantly exposed to strong winds such as on the upper stairs or rooftop of a building, apply the windproofing measures refe 2,000 or more 200 or more 15 or less · Installation of Outdoor Unit · · Before installation, check the strength and horizontalness of the base so that abnormal sounds do not emanate. According to the following base diagram, fix the base firmly with the anchor bolts.
*(Anchor bolt, nut: M10 x 4 pairs) 150 600 Drain hole · When water is to be drained through the drain hose, attach the following drain nipple and waterproof rubber cap, and use the drain hose (Inner diam: 16 mm) sold on the market. Also seal the knockout hole and screws securely with silicone material, etc., to prevent water from leaking. Some conditions may cause dewing or dripping of water. When collectively draining discharged water completely, use a drain pan. 150 430 40 400 365 Knockout hole Waterproof rubber cap (5 pcs.) Drain nipple · Drain nipple mounting hole · * As shown in the figure below, install the foundation and vibration-proof rubber pads to directly support the bottom surface of the fixing leg that is in contact with and underneath the bottom plate of the outdoor unit. When installing the foundation for an outdoor unit with downward piping, consider the piping work. GOOD Absorb vibration with vibration-proof rubber pads Please pay attention to the drain in region with snowfall and cold temperature, as it may be frozen and cause drainage problems. Punch the knockout holes on the base plate to improve drainability.*

Use a screwdriver and take off the knockout part outward. Fixing leg Knockout hole Waterproof rubber cap Foundation Drain nipple GOOD Bottom plate of outdoor unit For Reference If a heating operation is to be continuously performed for a long time under the condition that the outdoor temperature is 0 °C or lower, draining defrosted water may be difficult due to the bottom plate freezing, resulting in trouble with the cabinet or fan. It is recommended to procure an anti-freeze heater locally in order to safely install the air conditioner. For details, contact the dealer. Foundation Support the bottom surface of the fixing leg that is in contact with and underneath the bottom plate of the outdoor unit. EN 9 Digital Inverter 5 REFRIGERANT PIPING Knockout of Pipe Cover Knockout procedure Parts name A Refrigerant piping Liquid side: Ø12.7 mm Gas side: Ø19.

1 mm (Approx. 800 mm) Ø28.6 mm Pipe insulating material (polyethylene foam, 10 mm thick) Putty, PVC tape Q'ty One each Optional Installation Parts (Locally procured) B C Rear direction 1 One each REQUIREMENT Follow the instructions in the installation manual provided with the branch pipe kit and the instructions in the installation manual of the indoor unit to connect the refrigerant pipe between the branch pipe and indoor unit.

Pipe cover Side direction Front direction Down direction · · · · The indoor/outdoor connecting pipes can be connected in 4 directions. Take off the knockout part of the pipe cover through which pipes or wires will pass through the base plate. Detach the pipe cover and tap on the knockout section a few times with the shank of a screwdriver. A knockout hole can easily be punched. As shown in the figure below, it is easier to punch out the knockout hole when the pipe cover is left in place rather than when the cover is removed from the unit.

In knocking out the hole, the knockout section can easily be removed by hand once the bottom of the three locations where the section is joined along the guide lines is broken using a screwdriver. After punching out the knockout hole, remove burrs from the hole, and install the protective bush and guard material around the passage hole provided as accessories in order to protect the wires and pipes. Also be sure to attach the pipe covers after connecting the pipes. The pipe covers can be easily attached by cutting off the slits at the lower part of the covers. Refrigerant Piping Connection CAUTION TAKE NOTE OF THESE 4 IMPORTANT POINTS BELOW FOR PIPING WORK 1.

Keep dust and moisture away from inside the connecting pipes. 2. Tightly connect the connection between pipes and the unit. 3. Evacuate the air in the connecting pipes using a VACUUM PUMP. 4. Check for gas leaks at connection points. Piping connection Liquid side Outer diameter Ø12.7 mm Gas side Outer diameter Ø19.1 mm Ø28.

*6 mm Thickness 1.2 mm 1.0 mm (half hard) Thickness 0.8 mm REQUIREMENT * Be sure to wear heavy work gloves while working. On the gas side, be sure to use the Ø19.1 mm pipe provided with the outdoor unit. 10 EN Digital Inverter Flaring 1. Cut the pipe with a pipe cutter. Be sure to remove burrs that may cause a gas leak. 2.*

Insert a flare nut into the pipe, and then flare the pipe. Use the flare nuts supplied with the air conditioner or those for R410A. Insert a flare nut into the pipe, and flare the pipe. @@@@@@@@@@@2. @@@@@@@@@@If nitrogen is not passed through the pipe, the refrigerating cycle may become clogged by oxidized scales.

The Ø28.6 mm pipe cannot be passed through the pipe cover and knockout hole in the base plate so be sure to connect the Ø19.1 mm pipe and Ø28.6 mm pipe outside the outdoor unit. · EN 11 Digital Inverter Tightening of Connecting Part 1.

Align the centers of the connecting pipes and fully tighten the flare nut with your fingers. @@Pressure of R410A is higher than that of R22 (Approx. 1.6 times). @@@@@@@@@@@@(Unit: N·m) Outer dia. @@@@The ends of the branch pipes form a line perpendicular to the ground. Branch pipe Collecting pipe Branch pipe Collection area Liquid side Cap Gas side Piping valve Loosened NO GOOD Inclined Make sure that the pipes are installed level after branching. Tightened Flare nut Valve at gas side Length of straight sections on main pipe side of branch pipe Provide a straight section with a length of at least 500 mm on the main pipe side of the branch pipe. (Same for both liquid side and gas side) CAUTION 1. Do not put the crescent wrench on the cap or cover.

*The valve may break. 2. @@@@@@@@Open Handle Low fully. Turn ON the vacuum pump. @@(*2) Retighten the flare nut. @@(*1) Close Handle Low completely. Turn OFF the vacuum pump. @@Open the valve stem or valve handle fully. @@@@@@@@If air remains, the capacity may decrease. @@(If oil in the vacuum pump is put in an air conditioner including R410A, it may cause trouble with the refrigeration cycle.*

*) Compound pressure gauge 101 kPa (76 cmHg) Handle Low Charge hose (For R410A only) Pressure gauge Gauge manifold valve Handle High (Keep fully closed) Charge hose (For R410A only) Vacuum pump adapter for counter-flow prevention (For R410A only) Vacuum pump Charge port (Valve core (Setting pin)) Packed valve at gas side *2 Use the vacuum pump, vacuum pump adapter, and gauge manifold correctly referring to the manuals supplied with each tool before using them. Check that the vacuum pump oil is filled up to the specified line of the oil gauge. When air is not charged, check again whether the connecting port of the discharge hose, which has a projection to push the valve core, is firmly connected to the charge port. 14 EN Digital Inverter How to Open the Valve Open or close the valve. Liquid side Open the valve with a 4 mm hexagon wrench.*

Gas side Valve unit Insulating the Pipes · The temperatures at both the liquid side and gas side will be low during cooling so in order to prevent condensation, be sure to insulate the pipes at both of these sides. Insulate the pipes separately for the liquid side and gas side. Insulate the branch pipes by following the instructions in the installation manual provided with the branch pipe kit. Use the insulating material provided as an accessory to insulate the Ø19.1 mm pipe at the gas side.

Seal the area where the Ø19.1 mm pipe and Ø22.2 to Ø28.6 mm pipe are connected so that no gaps are left. · · · · Using a minus screwdriver, turn it counterclockwise by 90° until it hits the stopper. (Full open) Charge port REQUIREMENT Be sure to use an insulating material which can withstand temperatures above 120°C for the gas side pipe since this pipe will become very hot during heating operations. Flare nut Replenishing Refrigerant Handle position Closed completely Opened fully This model is a 30 m chargeless type that does not need to have its refrigerant replenished for refrigerant pipes up to 30 m. When a refrigerant pipe longer than 30 m is used, add the specified amount of refrigerant. Stopper pin Refrigerant replenishing procedure 1. After vacuuming the refrigerant pipe, close the valves and then charge the refrigerant while the air conditioner is not working.

2. When the refrigerant cannot be charged to the specified amount, charge the required amount of refrigerant from the charge port of the valve on the gas side during cooling. Main stopper Movable part of valve (Stem) · While the valve is fully opened, after the screwdriver has reached the stopper, do not apply torque exceeding 5 N·m. Applying excessive torque may damage the valve. Requirement for replenishing refrigerant Replenish liquid refrigerant. When gaseous refrigerant is replenished, the refrigerant composition varies, which disables normal operation.

Valve handling precautions · Open the valve stem until it strikes the stopper. It is unnecessary to apply further force. · Securely tighten the cap with a torque wrench. Cap tightening torque Ø12.

7 mm Valve size Ø19.1 mm Charge port 50 to 62 N·m (5.0 to 6.2 kgf·m) 20 to 25 N·m (2.0 to 2.

*5 kgf·m) 14 to 18 N·m (1.4 to 1.8 kgf·m) EN 15 Digital Inverter Adding additional refrigerant Figure of Simultaneous twin Indoor Unit Indoor Unit Figure of Simultaneous triple Indoor Unit Indoor Unit Indoor Unit Outdoor Unit 2 3 Outdoor Unit 2 4 3 1 1 Figure of Simultaneous double twin Indoor Unit Indoor Unit Indoor Unit Indoor Unit Outdoor Unit 4 5 6 7 2 3 1 Formula for calculating the amount of additional refrigerant (Formula will differ depending on the diameter of the liquid connecting side pipe.) * 1 to 7 are the lengths of the pipes shown in the figures above (unit: m). Simultaneous twin Diameter of connecting pipe (liquid side) 1 Ø12.*

7 2 Ø9.5 3 Ø9.5 Amount of additional refrigerant per meter (g/m) 80 40 Voir pièce jointe pour afficher la feuille de calcul Amount of additional refrigerant (g) = Amount of refrigerant added for main pipe + amount of refrigerant added for branch piping × (1 28) + × (2 + 3 4) Simultaneous triple Diameter of connecting pipe (liquid side) 1 Ø12.7 2 Ø9.5 3 Ø9.5 4 Ø9.5 Amount of additional refrigerant per meter (g/m) 80 40 Amount of additional refrigerant (g) = Amount of refrigerant added for main pipe + amount of refrigerant added for branch piping × (1 28) + × (2 + 3 + 4 6) Simultaneous double twin Outdoor unit Diameter of connecting pipe (liquid side) 1 Ø12.7 Ø12.7 2, 3 Ø9.5 Ø9.

5 4 to 7 Ø6.4 Ø9.5 Amount of additional refrigerant per meter (g/m) 80 80 40 40 20 40 Amount of additional refrigerant (g) = Amount of refrigerant added for main pipe + amount of refrigerant added for first branch piping + amount of refrigerant added for second branch piping × (1 28) + × (2 + 3 4) + × (4 + 5 + 6 + 7) × (1 28) + × (2 + 3 4) + × (4 + 5 + 6 + 7) SM2244 SM2804 16 EN Digital Inverter 7 ELECTRICAL WORK WARNING 1. Using the specified wires, ensure that the wires are connected, and fix wires securely so that the external tension to the wires does not affect the connecting part of the terminals. Incomplete connection or fixation may cause a fire, etc. 2. Be sure to connect the earth wire (grounding work). Incomplete grounding may lead to electric shock. Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone wires. 3.

The appliance shall be installed in accordance with national wiring regulations. @@@@@@@@@@2. @@3. There is no need to perform the P.C. @@Be sure to use the cord clamps attached to the product. @@@@Remove the panel, and you can see electric parts on the front side. A metal pipe can be installed through the hole for wiring. @@@@H07 RN-F or 60245 IEC 66 (1.5 mm2 or more) 2.

*When connecting the connecting wire to the outdoor unit terminal, prevent water from coming into the outdoor unit. 3. Secure the power supply wire and indoor/outdoor connecting wires using the cord clamp of the outdoor unit. 4. For interconnecting wires, do not use a wire joined to another on the way. Use wires long enough to cover the entire length. 5. Wiring connections differ in conformance to EMC standards, depending whether the system is twin, triple or double twin. Connect wires according to respective instructions. Wiring diagram * For details on the remote controller wiring/installation, refer to the Installation Manual enclosed with the remote controller.*

*Simultaneous twin system Remote controller Remote controller wiring Indoor side Remote controller inter-unit wiring A 1 B 2 3 Indoor side A 1 B 2 3 Indoor/Outdoor connecting wires 1 Outdoor side 2 3 N Indoor power inter-unit wiring CAUTION · · · · An installation fuse must be used for the power supply line of this air conditioner. Incorrect/incomplete wiring may lead to an electrical fire or smoke. Prepare an exclusive power supply for the air conditioner. This product can be connected to the mains power. Fixed wire connections: A switch that disconnects all poles and has a contact separation of at least 3 mm must be incorporated in the fixed wiring. L1 L2 L3 380-415 V 3N~, 50Hz 380 V 3N~, 60Hz Simultaneous triple and double twin system Remote controller Remote controller wiring Remote controller inter-unit wiring Remote controller inter-unit wiring Remote controller inter-unit wiring A Indoor side B Indoor side A 3 B Indoor side A 3 1 Indoor power inter-unit wiring B Indoor side A 3 Indoor power inter-unit wiring B 2 3 1 Indoor/Outdoor connecting wires 2 1 2 2 1 1 Outdoor side 2 3 N Indoor power inter-unit wiring L1 L2 L3 380-415 V 3N~, 50Hz 380 V 3N~, 60Hz Triple Double twin * * Use 2-core shield wire (MVVS 0.5 to 2.0 mm2 or more) for the remote controller wiring in the simultaneous twin, simultaneous triple and simultaneous double twin systems to prevent noise problems. Be sure to connect both ends of the shield wire to earth leads. Connect earth wires for each indoor unit in the simultaneous twin, simultaneous triple and simultaneous double twin systems.*

18 EN Digital Inverter Stripping length power cord and connecting wire Indoor/outdoor connecting wire Power supply wire 10 Earth screw L1 L2 L3 N 123 10 10 L1 L2 L3 N 10 Earth screw 1 2 3 50 30 50 40 Earth line Cord clamp Cord clamp (mm) Connecting wire Earth line Power supply wire Clamp filter (accessory) Cord clamp Cord clamp WARNING Be sure to attach the provided clamp filter to the power supply wire in order to conform to EMC standards. 8 EARTHING WARNING · Be sure to connect the earth wire. (grounding work) Incomplete grounding may cause an electric shock. Connect the earth line properly following applicable technical standards. Connecting the earth line is essential to preventing electric shock and to reducing noise and electrical charges on the outdoor unit surface due to the high-frequency wave generated by the frequency converter (inverter) in the outdoor unit.

If you touch the charged outdoor unit without an earth line, you may experience an electric shock. EN 19 Digital Inverter 9 FINISHING After the refrigerant pipe, inter-unit wires, and drain pipe have been connected, cover them with finishing tape and clamp them to the wall with off-the-shelf support brackets or their equivalent. Keep the power wires and indoor/outdoor connecting wires off the valve on the gas side or pipes that have no heat insulator.

10 TEST RUN · · Turn on the leakage breaker at least 12 hours before starting a test run to protect the compressor during startup. To protect the compressor, power is supplied from the 380-415 VAC input to the unit to preheat the compressor.

Check the following before starting a test run: · That all pipes are connected securely without leaks. · That the valve is open. If the compressor is operated with the valve closed, the outdoor unit will become overpressurized, which may damage the compressor or other components. If there is a leak at a connection, air can be sucked in and the internal pressure further increases, which may cause a burst or injury. Operate the air conditioner in the correct procedure as specified in the Owner's Manual. · 11 ANNUAL MAINTENANCE · For an air conditioning system that is operated on a regular basis, cleaning and maintenance of the indoor/outdoor units are strongly recommended. As a general rule, if an indoor unit is operated for about 8 hours daily, the indoor/outdoor units will need to be cleaned at least once every 3 months. This cleaning and maintenance should be carried out by a qualified service person. Failure to clean the indoor/outdoor units regularly will result in poor performance, icing, water leaking and even compressor failure. 12 AIR CONDITIONER OPERATING CONDITIONS For proper performance, operate the air conditioner under the following temperature conditions: Cooling operation Heating operation Dry valve temp.

Wet valve temp. 15°C to 46°C 20°C to 15°C If air conditioner is used outside of the above conditions, safety protection may work. 20 EN Digital Inverter 13 FUNCTIONS TO BE IMPLEMENTED LOCALLY Handling Existing Pipe When using the existing pipe, carefully check for the following: · Wall thickness (within the specified range) · Scratches and dents · Water, oil, dirt, or dust in the pipe · Flare looseness and leakage from welds · Deterioration of copper pipe and heat insulator · Before recovering the refrigerant in the existing system, perform a cooling operation for at least 30 minutes. · When using a Ø19.1 mm gas pipe for the existing piping, set bit 3 of SW802 (switch for existing pipe) on the P.C. board of the outdoor unit to ON. In this case, the heating performance may be reduced depending on the outside air temperature and room temperature. SW802 When shipped from factory 1234 When using existing pipe 1234 ON Cautions for using existing pipe · Do not reuse a flare nut to prevent gas leaks. Replace it with the supplied flare nut and then process it to a flare.

Blow nitrogen gas or use an appropriate means to keep the inside of the pipe clean. If discolored oil or much residue is discharged, wash the pipe. Check welds, if any, on the pipe for gas leaks. There may be a problem with the pressure resistance of the branching pipes of the existing piping. Replace them with branch pipes (sold separately).

Recovering Refrigerant Use the refrigerant recovery equipment to recover the refrigerant. · · · When the pipe corresponds to any of the following, do not use it. Install a new pipe instead. · The pipe has been opened (disconnected from indoor unit or outdoor unit) for a long period. · The pipe has been connected to an outdoor unit that does not use refrigerant R22, R410A or R407C.

· The existing pipe must have a wall thickness equal to or larger than the following thicknesses. Reference outside diameter (mm) 6.4 9.5 12.7 15.9 19.1 22.2 28.6 · Wall thickness (mm) 0.8 0.

8 0.8 1.0 1.2 1.0 1.0 Material -- -- -- -- -- Half hard Half hard Do not use any pipe with a wall thickness less than these thicknesses due to insufficient pressure capacity. EN 21 ON Digital Inverter 14 TROUBLESHOOTING You can perform fault diagnosis of the outdoor unit with the LEDs on the P.C. board of the outdoor unit in addition to using the check codes displayed on the wired remote controller of the indoor unit. Use the LEDs and check codes for various checks.

Details of the check codes displayed on the wired remote controller of the indoor unit are described in the Installation Manual of the indoor unit. Verifying current abnormal status 1. 2. 3. 4.

Check that DIP switch SW803 is set to OFF. Jot down the states of LED800 to LED804. (Display mode 1) Press SW800 for at least 1 second. The LED status changes to display mode 2. Check the code whose display mode 1 equals the LED states jotted down and display mode 2 equals the current flashing status of LED800 to LED804 from the following table to identify the cause.

Verifying an abnormal state in the past although the abnormal state no longer occurs 1. 2. 3. 4. Set bit 1 of DIP switch SW803 to ON. Jot down the states of LED800 to LED804. (Display mode 1) Press SW800 for at least 1 second. The LED status changes to display mode 2. Find an error whose display mode 1 equals the LED states jotted down and display mode 2 equals the current flashing states of LED800 to LED804 from the following table to identify the error. · An outside air temperature (TO) sensor error can be checked only while it occurs.

*22 EN Digital Inverter No. 1 2 3 4 5 6 7 8 9 Normal Cause Display mode 1 Display mode 2 D800 D801 D802 D803 D804 D800 D801 D802 D803 D804 Discharge (TD) sensor error Heat exchanger (TE) sensor error Heat exchanger (TL) sensor error Outside air temperature (TO) sensor error Suction (TS) sensor error Heat sink (TH) sensor error Outdoor temperature sensor (TE/TS) connection error Outdoor EEPROM error 10 Compressor lock 11 Compressor lock 12 Current detection circuit error 13 Thermostat for compressor activated 14 Model data not set (on the service P.C. board) 15 MCU-MCU communication error 16 Discharge temperature error 17 Abnormal power (open phase detected or abnormal voltage) 18 Heat sink overheat 19 Gas leak detected 20 4-way valve reverse error 21 High pressure release operation 22 Outdoor fan motor error 23 Compressor driver short-circuit protection 24 Position detection circuit error in one-line display 25 Ps sensor error 26 Ps drop down error (* The LEDs and DIP switches are located on the lower left of the P.C. board of the outdoor unit. ON ON : OFF : ON : Flashing) 1 2 3 4 1 2 3 4 SW804 ON SW805 ON Enlarged view of LEDs 1 2 3 4 1 2 3 4 SW802 SW803 SW800 SW801 SW806 LED D805 D804 D803 D802 D801 D800 D805 D804 D803 D802 D801 D800 EN 23 Digital Inverter 15 APPENDIX Work instructions The existing R22 and R407C piping can be reused for our digital inverter R410A product installations. WARNING Confirming the existence of scratches or dents on the existing pipes and confirming the reliability of the pipe strength are conventionally referred to the local site. Basic conditions needed to reuse existing pipes Check and observe the presence of three conditions in the refrigerant piping works.*

1.

Dry (There is no moisture inside of the pipes.) 2. Clean (There is no dust inside of the pipes.) 3. Tight (There are no refrigerant leaks.

) Restrictions for use of existing pipes In the following cases, the existing pipes should not be reused as they are. Clean the existing pipes or exchange them with new pipes. 1. When a scratch or dent is heavy, be sure to use new pipes for the refrigerant piping works. 2.

*When the existing pipe thickness is thinner than the specified "Pipe diameter and thickness," be sure to use new pipes for the refrigerant piping works. · The operating pressure of R410A is high (1.6 times that of R22 and R407C). If there is a scratch or dent on the pipe or a thinner pipe is used, the pressure strength may be inadequate, which may cause the pipe to break in the worst case. * Pipe diameter and thickness (mm) Reference outside diameter (mm) 6.4 9.5 12.7 15.9 19.1 22.*

2 28.6 Wall thickness (mm) 0.8 0.8 0.8 1.0 1.2 1.0 1.0 Material -- -- -- -- -- Half hard Half hard 6. When the existing air conditioner is removed after refrigerant has been recovered.

Check if the oil is judged to be clearly different from normal oil. · The refrigerator oil is copper rust green in color: There is the possibility that moisture has mixed with the oil and rust has been generated inside the pipe. · There is discolored oil, a large quantity of residue, or a bad smell. · A large quantity of shiny metal dust or other wear residue can be seen in the refrigerant oil. 7.

When the air conditioner has a history of the compressor failing and being replaced. · When discolored oil, a large quantity of residue, shiny metal dust, or other wear residue or mixture of foreign matter is observed, trouble will occur. 8. When temporary installation and removal of the air conditioner are repeated such as when leased etc. 9.

If the type of refrigerator oil of the existing air conditioner is other than the following oil (Mineral oil), Suniso, FreolS, MS (Synthetic oil), alkyl benzene (HAB, Barrel-freeze), ester series, PVE only of ether series. @@@@@@@@· There is the possibility of rain water or air, including moisture, entering the pipe. 4. When refrigerant cannot be recovered · There is the possibility that a large quantity of dirty oil or moisture remains inside the pipes. 5. When a commercially available dryer is attached to the existing pipes · There is the possibility that copper green rust has been generated. Curing of pipes When removing and opening the indoor or outdoor unit for a long time, cure the pipes as follows: · Otherwise rust may be generated when moisture or foreign matter due to condensation enters the pipes. · The rust cannot be removed by cleaning, and new pipes are necessary. @@NO Is it possible to operate the existing air conditioner? @@30 minutes or longer, recover the refrigerant. @@@@Note] In case of twin pipes, also be sure to flush the branching pipe.*

(If there is discharge of remains, it is judged that a large quantity of remains are present.) Was largely discolored oil or a large quantity of remains discharged? (When the oil deteriorates, the color of the oil changes to a muddy or black color.) NO Connect the indoor/outdoor units to the existing pipe. · Use a flare nut attached to the main unit for the indoor/outdoor units. (Do not use the flare nut of the existing pipe.) · Re-machine the flare machining size to size for R410A. Piping necessary to change the flare nut/ machining size due to pipe compression 1) Flare nut width: H Copper pipe outer diameter H YES Clean the pipes or use new pipes. When using a Ø19.1 mm pipe for the gas pipe of the first branching pipe Turn the existing pipe switch on the cycle control P.C.

board of the outdoor unit to ON side. At shipment from factory OFF ON for existing pipe (Refer to the table below.) (Be sure to set the contents in the table below in order to restrict the refrigerating cycle pressure of the equipment in the pipe standard.) Existing pipe SW Switch Bit 3 of SW802 (mm) Ø6.4 17 Ø9. 5 22 Ø12.7 26 24 Ø15.9 29 27 Ø19.1 36 Same as above For R410A For R22 Same as above 2) Flare machining size: A (mm) ON A Copper pipe outer diameter For R410A Ø6.4 9.

1 9.0 Ø9.5 13.2 13.0 Ø12.7 16.6 16.2 Ø15.9 19.7 19.

4 Ø19.1 24.0 23.3 · (Airtight test), Vacuum dry, Refrigerant charge, Gas leak check For R22 Becomes a little larger for R410A Do not apply refrigerator oil to the flare surface. Trial run EN 25 WARNINGS ON REFRIGERANT LEAKAGE Check of Concentration Limit The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its concentration will not exceed a set limit. The refrigerant R410A which is used in the air conditioner is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its concentration should rise excessively. Suffocation from leakage of R410A is almost non-existent. With the recent increase in the number of high concentration buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power etc. Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared with conventional individual air conditioners.

If a single unit of the multi conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its concentration does not reach the limit (and in the event of an emergency, measures can be made before injury can occur). In a room where the concentration may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device. The concentration is as given below. Total amount of refrigerant (kg) Min. volume of the indoor unit installed room (m3) Concentration limit (kg/m3) The concentration limit of R410A which is used in multi air conditioners is 0.

3kg/m3. NOTE 1 : If there are 2 or more refrigerating systems in a single refrigerating device, the amounts of refrigerant should be as charged in each independent device. Outdoor unit e.g., charged amount (15kg) Very small room Small room Medium room Large room Outdoor unit Important NOTE 2 : The standards for minimum room volume are as follows.

(1) No partition (shaded portion) (2) When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door). Outdoor unit Refrigerant piping Indoor unit (3) If an indoor unit is installed in each partitioned room and the refrigerant piping is interconnected, the smallest room of course becomes the object.

But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object. Refrigerant piping Indoor unit Mechanical ventilation device - Gas leak detector e.g., charged amount (10kg) NOTE 3 : The minimum indoor floor area compared with the amount of refrigerant is roughly as follows: (When the ceiling is 2.7m high) 40 Range below the m2 35 density limit of 3 30 0.3 kg/m (countermeasures 25 not needed) Min. indoor floor area Room A Room B Room C Room D Room E Room F Indoor unit 20 15 10 5 0 Range above the density limit of 0.

3 kg/m3 (countermeasures needed) For the amount of charge in this example: The possible amount of leaked refrigerant gas in rooms A, B and C is 10kg. The possible amount of leaked refrigerant gas in rooms D, E and F is 15kg. 10 20 30 Total amount of refrigerant kg DH91301299 .